REMARKS

Introduction

Claims 1-9 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Bruehmann et al. U.S. Patent No. 6,089,831 (hereinafter "Bruehmann") in view of Nemster et al. U.S. Patent No. 5,960,777 (hereinafter "Nemser").

Summary of Applicants' Reply

Applicants have amended claims 1 and 4 and have canceled claims 2 and 5 without prejudice. No new matter has been added, and the amendments are fully supported by the originally-filed application. For example, support for the claim amendments can be found at least on pages 6 and 7 and FIG. 2 of applicants' application. In view of the foregoing amendments and following remarks, reconsideration and allowance of this patent application is earnestly solicited.

Applicants' Reply to the Rejection of Claims 1-9

Claims 1-9 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Bruehmann in view of Nemser. Applicants respectfully traverse the foregoing claim rejections for the reasons set forth herein.

Claims 1-3

Applicants' amended independent claim 1 defines a method for detecting failure of an air consumer circuit in a compressed air system. The method includes the steps of measuring a variable of state in a compressed air consumer circuit, comparing at least one of said variable of state and a negative gradient of said variable of state against a respective threshold

value, and "when at least one of said variable of state and said negative gradient of said variable of state satisfies a preselected circuit-failure criterion, shutting off said compressed air consumer circuit, and wherein said preselected circuit-failure criterion is satisfied when at least one of said variable of state and said negative gradient of said variable of state is below said respective threshold value for a time at least one of equal to and greater than a time of at least one of a dynamic change of said variable of state and a dynamic collapse of said variable of state".

Bruehmann describes embodiments of a compressed air supply device having an air compressor connected to an air drier for supplying compressed air to consumer circuits. Bruehmann discusses using pressure sensors to monitor pressure in the consumer circuits and to send signals to control electronics. If the control electronics of Bruehmann detect a defect in a consumer circuit, such as when pressure in a consumer circuit falls below a predetermined pressure threshold, then the control electronics *immediately* disconnect the affected consumer circuit from the compressed air supply (see, Bruehmann, column 7, lines 59-64).

In direct contrast to applicants' claimed invention, Bruehmann neither teaches nor suggests a method that provides for the shutting off of a compressed air consumer circuit "when at least one of said variable of state and said negative gradient of said variable of state satisfies a preselected circuit-failure criterion, shutting off said compressed air consumer circuit, and wherein said preselected circuit-failure criterion is satisfied when at least one of said variable of state and said negative gradient of said variable of state is below said respective threshold value for a time at least one of equal to and greater than a time of at least one of a dynamic change of said variable of state and a dynamic collapse of said variable of state". In fact, Bruehmann's device is substantially similar to a conventional multi-circuit protective valve described in applicants' specification. For example, as described in applicants' specification, in a

conventional multi-circuit protective valve, the "compressed air consumer circuits will be immediately shut off" if a dynamic pressure collapse is detected, "even though no defect due to a line break or the like exists" (see, applicants' specification, pages 6 and 7).

Moreover, although Bruehmann discusses monitoring the state of a compressed air system (e.g., monitoring the operating pressure or compressed air consumption of a consumer circuit), Bruehmann merely discusses switching on or off an air compressor in response to the fulfillment of a suitable requirement (see, Bruehmann, column 2, lines 37-45 and 65-67 and column 3, lines 1-3). Nowhere does Bruehmann discuss shutting off a compressed air consumer circuit "when at least one of said variable of state and said negative gradient of said variable of state is below said respective threshold value for a time at least one of equal to and greater than a time of at least one of a dynamic change of said variable of state and a dynamic collapse of said variable of state", as is required by applicants' amended independent claim 1.

Furthermore, as acknowledged by the Examiner on page 2 of the Final Office Action, nowhere does Bruehmann teach or suggest measuring and comparing a negative gradient of a variable of state against a respective threshold value to determine whether to disconnect consumer circuits from a compressed air supply. In order to overcome this deficiency of Bruehmann, the Examiner has relied on Nemser.

Nemser describes embodiments of an apparatus and method of operating an internal combustion engine with a plentiful and portable source of oxygen or nitrogen enriched air. In particular, Nemser discusses a membrane unit that is divided into two portions: a retentate cavity and a permeate cavity. When incoming ambient air is introduced into the retentate cavity, a negative pressure gradient is created across a membrane of the membrane unit (see, Nemser, column 4, lines 4-53). This negative pressure gradient in turn induces selective permeation

through the membrane unit, which allows oxygen or nitrogen enriched air to enter the permeate cavity (see, Nemser, column 9, lines 20-33). As defined in Nemser, a negative pressure gradient refers to when the "pressure of the retentate cavity is higher than that of the permeate cavity" (see, Nemser, column 4, lines 28-30).

Nemser is not at all concerned with, and accordingly does not teach or suggest, comparing a negative gradient of a variable of state against a threshold value to determine whether to disconnect consumer circuits from a compressed air supply. The negative gradients contemplated by Nemser and by applicants refer to completely distinct concepts. In Nemser, the negative pressure gradient allows for ambient air to automatically separate into different cavities. In contrast, the negative gradient in an individual compressed air consumer circuit of applicants' claimed invention is compared against a threshold value, where the output of that comparison is then used to shutoff a compressed air consumer circuit.

Furthermore, even if one were motivated to combine the invention of Nemser with Bruehmann, the resulting output would still not yield the claimed invention. In particular, the negative pressure gradient discussed by Nemser refers to a relative pressure difference between two cavities, rather than the negative gradient in a single compressed air consumer circuit, as would be required for the operation of Bruehmaan's compressed air supply device.

Thus, for at least the foregoing reasons, applicants' amended independent claim 1 and each one of the claims dependent therefrom, including claims 2, 3, and 8, are allowable over Bruehmann and Nemser. Applicants respectfully request, therefore, that the rejection under 35 U.S.C. §103(a) of claims 1, 2, 3, and 8 with respect to Bruehmann and Nemser be withdrawn.

Claims 4-9

Applicants' amended independent claim 4 defines a system that includes, among other components, sensors for monitoring pressure in compressed air consumer circuits and an electronic control unit for evaluating electrical signals from the sensors and for controlling electrically actuatable valves. In addition, the electronic control unit compares at least one of a variable of state in each compressed air consumer circuit and a negative gradient of the variable of state in each compressed air consumer circuit against a respective threshold value, and identifies failed ones of the compressed air consumer circuits. Furthermore, the electronic control unit determines that at least one of the variable of state and the negative gradient satisfy a preselected circuit-failure criterion when at least one of the variable of state and the negative gradient is below the respective threshold value for a time at least one of equal to and greater than a time of at least one of a dynamic change of the variable of state and a dynamic collapse of the variable of state. The electronic control unit then switches ones of the electrically actuated valves associated with the failed ones of the compressed air consumer circuits to a closed state to shut off the failed ones of the compressed air consumer circuits.

For at least the reasons articulated above, applicants respectfully submit that the combination of Bruehmann and Nemser would not yield applicants' amended independent claim 4. Nowhere does Bruehmann or Nemser show a control unit that determines that at least one of a variable of state and a negative gradient satisfy a preselected circuit-failure criterion when at least one of the variable of state and the negative gradient is below the respective threshold value for a time at least one of equal to and greater than a time of at least one of a dynamic change of the variable of state and a dynamic collapse of the variable of state, as required by applicants' amended independent claim 4.

Thus, for at least the foregoing reasons, applicants' amended independent claim 4 and each one of the claims dependent therefrom, including claims 5-7 and 9, are allowable over Bruehmann and Nemser. Applicants respectfully request, therefore, that the rejection under 35 U.S.C. §103(a) of claims 4-7 and 9 with respect to Bruehmann and Nemser be withdrawn.

Conclusion

On the basis of the foregoing amendments and remarks, applicants respectfully submit that this application is in condition for allowance, and notice to this effect is respectfully requested. The Examiner is invited to contact applicants' undersigned attorneys at the telephone number set forth below if it will advance the prosecution of this case.

The fee set forth in 37 CFR 1.17 for a one-month extension of time is $130. Authorization is hereby given to charge this fee to Deposit Account No. 50-0540. No additional fee is believed due with this Reply. The Director is hereby authorized to charge any fee deficiency or credit any overpayment to Deposit Account No. 50-0540.

Respectfully submitted,

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